Paediatric and Adult ADHD

ADHD IN CHILDREN AND ADULTS

Board Review Summary

ADHD is a common neurodevelopmental disorder characterized by a persistent pattern of inattention and/or hyperactivity–impulsivity that interferes with functioning or development.

DIAGNOSTIC CRITERIA (DSM-5)

CHILDREN <17 YEARS

- ≥6 symptoms of inattention and/or hyperactivity–impulsivity for ≥6 months
- Several symptoms present <12 years
- Symptoms present in ≥2 settings (e.g., home, school)
- Clear evidence of functional impairment
- Not better explained by another mental disorder

INATTENTION

Examples: careless, difficulty sustaining attention, doesn't listen, disorganized, loses things

HYPERACTIVITY–IMPULSIVITY

Examples: fidgeting, leaves seat, talks excessively, interrupts, acts without thinking

ADULTS (≥17 YEARS)

- ≥5 symptoms of inattention and/or hyperactivity–impulsivity for ≥6 months
- Several symptoms present before age 12
- Symptoms present in ≥2 settings
- Clear evidence of functional impairment
- Not better explained by another mental disorder

Note: Hyperactivity symptoms may be less prominent in adults (e.g., inner restlessness).

PRESENTATION

Children

- Inattention, distractibility, disorganization
- Hyperactivity (motor restlessness)
- Impulsivity (interrupts, blurts out)
- Academic difficulties, behavior problems
- Low frustration tolerance

Adults

- Inattention: poor concentration, forgetfulness, difficulty with organization, time management
- Hyperactivity: restlessness, feeling "on edge"
- Impulsivity: interrupting, decision making, risk-taking
- Emotional dysregulation, low self-esteem
- Increased risk: depression, anxiety, substance use, accidents, occupational underachievement

EPIDEMIOLOGY

- Children: ~5–10%
  Adults: ~2.5%
- More common in males in childhood (~2:1); sex ratio narrows in adults
- High heritability (~70–80%)
- Often comorbid with learning disorders, tic disorders, ODD, anxiety, depression, substance use

ASSESSMENT

- Comprehensive clinical history
  - Developmental, academic/occupational
  - Home, school/work, social
  - Family history
- Use validated rating scales
  - Children: Vanderbilt, Conners 3, SNAP-IV
  - Adults: ASRS v1.1, CAARS
- Assess for comorbidities and differential diagnoses
- Physical exam and targeted investigations to rule out mimics

DIFFERENTIAL DIAGNOSIS

- Anxiety disorders
- Depression
- Learning disorders
- Autism spectrum disorder
- Sleep disorders
- Substance use disorders
- Thyroid dysfunction
- Sensory impairment
- Medication/substance effects
- Bipolar disorder

★ Consider ADHD when symptoms are chronic, pervasive, impairing, and present across settings.

INVESTIGATIONS (as clinically indicated)

- No single test confirms ADHD
- Consider baseline assessments:

✓ CBC, ferritin (if RLS suspected)
✓ Thyroid function (TSH)
✓ Electrolytes, LFTs (if starting meds)
✓ BP, HR, height, weight, BMI
✓ ECG (if personal/family cardiac history or symptoms)
✓ Sleep assessment if indicated

NON-PHARMACOLOGIC INTERVENTIONS

- Psychoeducation (patient and family)
- Behavioral therapy / Parent training (children)
- CBT (organizational skills, time management)
- School accommodations / 504 plan / IEP
- Exercise, sleep hygiene, structure, routines
- Mindfulness-based strategies

PHARMACOLOGIC TREATMENT

CLASS	EXAMPLES	MECHANISM	PEARLS
Stimulants (First-line)	Methylphenidate (IR, ER: OROS, Concerta, Ritalin LA, Daytrana) Amphetamines (Adderall IR/XR, Vyvanse)	Increase synaptic dopamine and norepinephrine	• Most effective • Onset: 30–60 min (IR), 1–2 h (ER) • Monitor BP, HR, growth, appetite, sleep • Low abuse risk with proper use
Non-stimulants (Alternatives / Adjuncts)	Atomoxetine (Strattera)	Selective NE reuptake inhibitor	• Onset: 2–4 weeks • Good for tics, anxiety, substance use risk
Alpha-2 agonists (Adjuncts)	Guanfacine ER (Intuniv) Clonidine ER (Kapvay)	Stimulate α2 receptors in prefrontal cortex	• Helpful for hyperactivity, impulsivity, sleep • Sedation, hypotension

COMMON ADVERSE EFFECTS

Stimulants
Decreased appetite, weight loss, insomnia, headache, abdominal pain, ↑BP/HR, irritability; rare: tics, mood changes

Atomoxetine
Nausea, decreased appetite, fatigue, rare: ↑LFTs, suicidal ideation (box warning)

Alpha-2 agonists
Sedation, dizziness, hypotension, bradycardia, dry mouth

Avoid stimulants in: uncontrolled hypertension, serious heart disease, thyrotoxicosis, glaucoma, or history of stimulant misuse/diversion.

PROGNOSIS

Symptoms often persist into adulthood in ~50–70%. With appropriate treatment, individuals can achieve significant improvement in academic, occupational, and social functioning.

KEY TAKEAWAYS

✓ ADHD is a clinical diagnosis based on history, symptoms across settings, and functional impairment.
✓ Treat comorbidities and use multimodal management for best outcomes.
✓ Regular follow-up to monitor efficacy, side effects, growth (children), BP/HR, and functional goals.

References: DSM-5-TR; American Academy of Pediatrics ADHD Clinical Practice Guideline (2019); NICE Guideline NG87 (2018); UpToDate.

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Comparison Table: Atomoxetine vs Methylphenidate

Feature	Atomoxetine	Methylphenidate
Class / Mechanism	Selective norepinephrine reuptake inhibitor (non-stimulant)	CNS stimulant (dopamine & norepinephrine reuptake inhibition)
Onset of action	Slow (2–6 weeks for full effect)	Rapid (within hours to days)
Efficacy	Moderate; generally less robust vs stimulants	High; first-line due to superior symptom control
Dosing	Once daily	Multiple formulations (IR, SR, ER); flexible dosing
Abuse potential	None (not a controlled drug)	Present (controlled substance)
Use in substance use disorder	Preferred option	Use cautiously or avoid
Effect on anxiety	May improve comorbid anxiety	Can exacerbate anxiety in some patients
Sleep effects	Less insomnia; may cause somnolence	Common insomnia, especially if late dosing
Appetite effects	Mild appetite suppression	More pronounced appetite suppression
Cardiovascular effects	Mild ↑HR/BP	More significant ↑HR/BP; requires monitoring
Psychiatric adverse effects	Rare irritability, possible suicidal ideation (early treatment)	irritability, agitation, rarely psychosis
Hepatic effects	Rare hepatotoxicity (monitor LFTs if symptomatic)	No significant hepatotoxicity
Drug interactions	CYP2D6 metabolism (watch inhibitors like fluoxetine)	Fewer CYP interactions
Adherence	Simpler (once daily, steady effect)	May be affected by dosing schedule variability
Regulatory status	Non-controlled	Controlled drug (restrictions apply)

Clinical Interpretation (Key Points)

- **Methylphenidate**
  - First-line in most adults due to **greater efficacy and rapid onset**
  - Best for patients needing **immediate symptom control**
  - Limitations: abuse potential, sleep disturbance, appetite suppression
- **Atomoxetine**
  - Useful in **patients with substance misuse risk, anxiety, or intolerance to stimulants**
  - Slower onset but **more stable 24-hour coverage**
  - Consider when stimulants are contraindicated or not tolerated

Starting Methylphenidate in Adults

1. General Principles

- Start **low and titrate gradually** (optimize efficacy vs tolerability).
- Aim for **long-acting formulations** where possible (better adherence, less abuse potential).
- Adjust based on **clinical response and side effects**, not just dose.

Immediate-Release (IR) Methylphenidate

Step	Dose
Starting	5 mg **once or twice daily** (usually morning ± noon).
Titration	Increase by 5–10 mg per week, divided 2–3 times daily.
Typical effective range	20–40 mg/day.
Max recommended	~60 mg/day (some guidelines allow up to 72 mg/day under specialist supervision).

Extended-Release (ER/XR/OROS, e.g. Concerta, Medikinet XL)

Step	Dose
Starting	18–27 mg **once daily in the morning**.
Titration	Increase by 9–18 mg every 1–2 weeks.
Typical effective range	36–72 mg/day.
Max recommended	72 mg/day (some regions allow up to 108 mg/day in selected adults).

Practical Considerations

- **Switching IR → ER**: Match total daily IR dose to closest ER equivalent.
- **Monitoring**: BP, HR, weight, appetite, sleep, mood.
- **Drug holidays**: Sometimes considered in younger patients; less relevant in adults.
- **Contraindications**: Severe anxiety, uncontrolled hypertension, structural cardiac disease, active substance misuse.